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We claim:

1. A set of protein-coding genes that provides the information required for growth and replication of a free-living organism under axenic conditions in a rich bacterial culture medium,

wherein the set lacks at least 40 of the 101 protein-coding genes listed in Table 2, or functional equivalents thereof, wherein at least one of the genes in Table 4 is among the lacking genes;

wherein the set comprises between 350 and 381 of the 381 protein-coding genes listed in Table 3, or functional equivalents thereof, including at least one of the genes in Table 5; and

wherein the set comprises no more than 450 protein-coding genes.

2. The set of claim 1, which lacks at least 55 of the genes listed in Table 2.

3. The set of claim 1, which lacks at least 70 of the genes listed in Table 2.

4. The set of claim 1, which lacks at least 80 of the genes listed in Table 2.

5. The set of claim 1, which lacks at least 90 of the genes listed in Table 2.

6. The set of any of claims **1-5**, which comprises at least 360 of the genes listed in Table 3.

7. The set of any of claims **1-5**, which comprises at least 370 of the genes listed in Table 3.

8. The set of any of claims **1-5**, which comprises at least 380 of the genes listed in Table 3.

9. A set comprising the set of any of claims **1-8**, and further comprising genes encoding an ABC transporter for phosphate import, selected from the group consisting of (a) MG410, MG411 and MG412, and (b) MG289, MG290 and MG291, and functional equivalents thereof.

10. A set comprising the set of any of claims **1-9**, and further comprising a lipoprotein-encoding gene selected from the group consisting of MG185 and MG260, and functional equivalents thereof.

11. A set comprising the set of any of claims **1-10**, and further comprising a glycerophosphoryl diester phosphodiesterase gene selected from the group consisting of MG293 and MG385, and functional equivalents thereof.